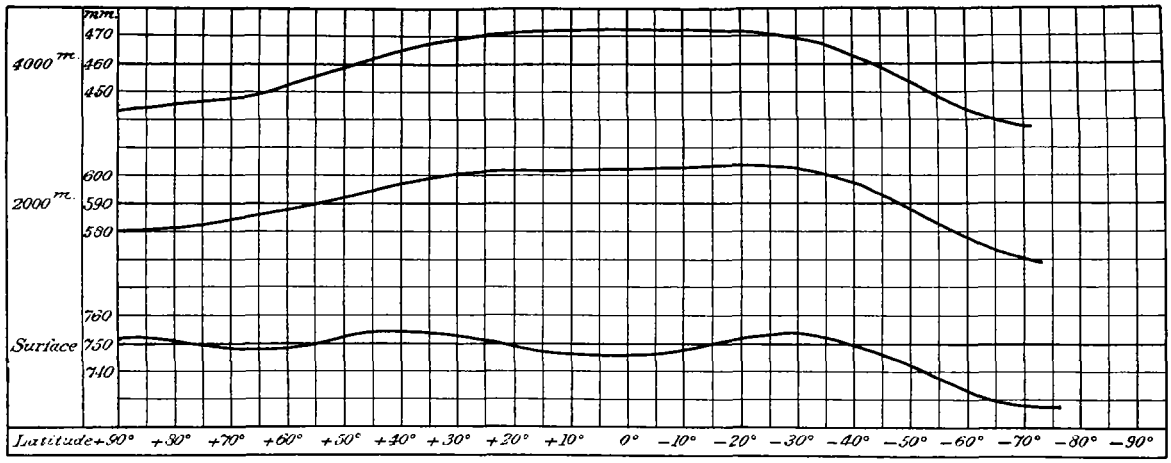

FIG. 20.—Pressures at different latitudes (Ferrel) and altitudes (Sprung).

It is my purpose to work out the data for the temperate and the tropical zones now in the possession of the Weather Bureau and applicable to the North American Continent, along the lines here indicated. The attempt to bring these laws of the general and the local circulations into a harmonious numerical scheme will require considerable labor, but it is believed that it can be accomplished. The data contained in my reports, while apparently somewhat disconnected, are in reality all contributory to my solution of the problems of atmospheric circulations both of the earth and of the sun, together with the connections between them. It is proper to determine carefully the separate portions of the work, i. e., the velocities and temperatures of the strata in motion as dependent upon observations, before trying to put them together in a final synthesis. It is only necessary to have in mind the general plan of development, as here outlined, in order to keep the several portions in harmonious relations with each other.

CLIMATOLOGY OF COSTA RICA.

Communicated by Mr. H. PITTIER, Director, Physical Geographic Institute.

[For tables see the last page of this REVIEW preceding the charts.]

Notes on the weather.—On the Pacific slope, the rainfall was without exception much above the normal. Violent and cold winds have been blowing almost continually, accompanied by mist and rain, which greatly hindered the coffee picking. In San José, pressure temperature and relative humidity were normal, but the rainfall exceeded six times the mean amount for the past fifteen years, 63 millimeters (2.48 inches) and eight days against 10 millimeters (0.39 inches) and three days. Notwithstanding the frequence of rain, the hours of sunshine were above the normal 220.3 against 199.6. The few reports received from the stations of the Atlantic slope indicate a remarkable scarcity of rain in contrast with the diluvial showers of December, 1903.

Notes on earthquakes.—January 14, 2h 37m a. m., slight shock E–W., intensity II, duration 6 seconds; 6h 35m p. m., tremors, apparently E–W., intensity I, duration 3 seconds. January 15, 3h 54m p. m., very slight shock E–W., intensity I, duration 4 seconds; 4h 45m p. m., tremors. January 16, 6h 59m p. m., strong shock E–W., intensity III, duration 2 seconds. January 20, 9h 21m a. m., strong shock E–W., intensity III, duration 6 seconds; 9h 2m p. m., slight shock E–W., intensity I, duration 2 seconds; 9h 18m p. m., shock E–W., intensity II, duration 10 seconds. January 23, 8h 40m p. m., strong shock E–W., intensity III, duration 10 seconds. January 24, 1h 46m a. m., slight shock E–W., intensity II, duration 4 seconds. January 25, 11h 17m p. m., slight shock E–W., intensity I, duration 3 seconds. January 31, 10h 43m p. m., slight shock ENE–WSW., intensity II, duration 3 seconds.

ANNUAL CLIMATOLOGICAL SUMMARY FOR HAWAII.

By R. C. LYDECKER, Territorial Meteorologist.

The following is the rainfall for the year 1903 as gaged at the several stations of the Weather Bureau. The heaviest rainfall during the year was at Nahiku, Maui, at an elevation of 1600 feet. The rainfall here was 319.80 inches, or practically 26.6 feet. The next heaviest rainfall was at Puuohua, Hawaii, at an elevation of 1050 feet, 244.20 inches, or upwards of 20 feet.

Least rainfall, U. S. Magnetic Station, Sisal, Oahu, 8.19 inches.

Approximate percentage of district rainfall as compared with normal: Hawaii, Hilo district, 100 per cent; Hamakua, 110; Kohala, 98; Waimea, 86; Kona, 95; Kau, 62; Puna, 89; island of Maui, 130; island of Oahu, Honolulu district, 72; Nuuanu, 96; Koolau, 67; Ewa, 60; island of Kauai, 72.

Stations.	Elevation.	Amount.
HAWAII.		
HILO, e. and ne.	*Feet.*	*Inches.*
Waiakea	50	118.89
Hilo (town)	100	132.01
Kaumana	1,250	174.41
Pepeekeo	100	112.85
Hakalau	200	129.68
Honohina	300	145.40
Puuohua	1,050	244.20
Laupahoehoe	500	170.30
Ookala	400	105.53
HAMAKUA, ne.		
Kukaiau	250	97.29
Paauilo	300	75.34
Paauhau	300	60.37
Honokaa (Mill)	425	68.45
Honokaa (Meinicke)	1,100	91.52
Kukuihaele	700	75.04
KOHALA, n.		
Niulii	200	53.60
Kohala (Mission)	521	51.92
Kohala (Sugar Co.)	270	48.45
Hawi Mill	700	51.34
Puakea Ranch	600	38.07
Puuhue Ranch	1,847	38.88
Waimea	2,720	35.00
KONA, W.		
Holualoa	1,350	56.11
Kealakekua	1,580	63.22
Napoopoo	25	31.25
Hoopuloa	1,650	45.96
Hoopuloa	2,300	65.37
KAU, sc.		
Kahuku Ranch	1,680	24.42
Honuapo	15	19.32
Naalehu	650	29.05
Pahala	810	24.97
Volcano House	4,000	67.44
PUNA, e.		
Kapoho	110	72.41
Pahoa	600	121.10
MAUI.		
Waiopae Ranch	700	11.95
Kaupo (Mokulau) s	285	72.23
Kipahulu	308	80.32
Nahiku	1,600	319.80
Haiku	700	85.40
Kula (Erehwon)	4,500	35.06
Kula Waiakoa	2,700	18.70

Stations.	Elevation.	Amount.
MAUI.—Cont'd.	*Feet.*	*Inches.*
Puunomalei	1,400	87.40
Paia	180	53.76
Haleakala Ranch	2,000	60.46
Wailuku	250	28.97
OAHU.		
Punahou (W. B.), sw	47	32.68
Kulaokahua (Castle), sw	50	22.00
Makiki Reservoir	120	32.57
U. S. Naval Station, sw	6	18.34
Kapiolani Park, sw	10	14.02
College Hills	175	38.50
Manoa (Woodlawn Dairy) e	285	95.60
Manoa (Rhodes Gardens)	360	125.95
Insane Asylum	30	28.19
Kalihi-uka	485	98.29
Nuuanu (W. W. Hall), sw	50	35.58
Nuuanu (Wyllie street)	250	54.75
Nuuanu (Elec. Station), so.	405	56.08
Nuuanu (Luakaha), e	850	145.73
U. S. Experiment Station	350	45.19
Kaliula	1,150	95.08
Tantalus Heights (Frear)	1,360	107.22
Waimanalo, ne	25	28.31
Mamawili, ne	300	68.42
Kaneohe	100	41.51
Ahuimanu, ne	350	73.59
Kahuku, n	25	19.40
Wahiawa	900	35.62
Ewa Plantation, s	60	12.40
U. S. Magnetic Station	45	8.19
Waipahu	200	9.30
Moanalua	15	27.85
KAUAI.		
Lihue (Grove Farm), e	200	32.06
Lihue (Molokoa), e	300	33.61
Lihue (Kukaua), e	1,000	71.19
Lihue (Kilohana)	400	38.25
Kealia, e	15	16.66
Kilauea Plantation, ne	325	47.34
Hanalei, n	10	80.51
Waiawa	32	10.35
Eleele	150	20.86
Wahiawa (Mountain)	3,000	142.45
McBryde (Residence)	850	53.41
Lawai (Government Road)	450	61.92
Lawai, w	225	26.60
Lawai, e	800	58.98
Koloa	100	29.87